

Application No. 10/533,955  
Attorney Docket No. 052494

Amendment under 37 C.F.R. §1.111  
Amendment filed: September 22, 2006

**AMENDMENTS TO THE DRAWINGS**

The attached sheets of drawings include changes to Figs. 1, 2, 5, 7a, 7b, 8, 9, 10, 11, 12  
and 14.

**REMARKS**

Claims 1-4 are pending in the present application. Claims 1 and 2 are rejected. Claim 1 is herein amended. No new matter has been entered.

**Drawings**

The Examiner asserts that Figs. 1, 2, 5, 7a, 7b, 8, 9, 10, 11, 12 and 14 are unclear. Applicants submit herewith replacement drawing sheets including Figures 1, 2, 5, 7a, 7b, 8, 9, 10, 11, 12 and 14. Applicants submit that the non-photographic drawings are clear, and the shading present therein helps show the three-dimensional character of the invention.

**Claim Rejections - 35 U.S.C. §102(b)**

Claim 1 is rejected under 35 U.S.C. §102(b) as being anticipated by JP-10257751 to Saburo, which was submitted by Applicants in the IDS filed on May 4, 2005.

The Examiner asserts that Saburo discloses a rotator (1) including a center shaft (2) and a spiral-shaped portion protruding in the radial direction provided on the outer circumference of the center shaft; and

a stator (11) comprising hollow magnetic poles forming a center space having a spiral-shaped groove (12) with the same pitch as the rotator,

wherein the center shaft (2) of the rotator (1) is within the hollow magnetic poles forming a center space of the stator (11);

the side face of the spiral-shaped portion of the rotator in the axial direction and the side face of the spiral-shaped groove of the stator in the axial direction are opposed to each other (Fig. 1);

the spiral-shaped portion is rotatable in a spiral shape within the spiral-shaped groove of the hollow magnetic poles forming a center space; and

the rotator moves linearly in the axial direction while rotating in a spiral shape with respect to the stator.

Applicants herein clarify the claimed invention. Thereafter, Applicants respectfully disagree with the rejection, because not all of the claimed limitations appear to be met by the cited reference.

Applicants note that Saburo discloses a linear motor including a spiral shaped rotator on a center shaft and a stator a stator having hollow magnetic poles forming a center space having a spiral-shaped groove with the same pitch as the rotator. The center shaft and the rotator are within the hollow magnetic poles forming a center space of the stator. The side face of the spiral-shaped portion of the rotator in the axial direction and the side face of the spiral-shaped groove of the stator in the axial direction are opposed to each other. The spiral-shaped portion is rotatable in a spiral shape within the spiral-shaped groove of the hollow magnetic poles forming a center space, and the rotator moves linearly in the axial direction while rotating in a spiral shape with respect to the stator.

However, the cited reference does not include on the rotator a spiral-shaped portion protruding in the radial direction wherein the side face of the spiral-shaped portion of the rotator

in the axial direction and the side face of the spiral-shaped groove of the stator in the axial direction are opposed to each other as intended by the Inventors.

Applicants submit that the cited reference may be asserted to have spiral-shaped portion protruding in the radial direction, however minor. Moreover, the rotator and the stator are opposed to each other along the axial direction, even though the **side face of rotator in the axial direction** and the **side face of the spiral-shaped groove of the stator in the axial direction** are not opposed to each other in the cited reference.

Applicants note that in the present invention, the rotator in the axial direction and the side face of the spiral-shaped groove of the stator in the axial direction are opposed to each other in a direction parallel with the axis of the center shaft.

Therefore, Applicants herewith clarify claim 1 to recite:

“...a rotator including a center shaft having an axis and a spiral-shaped portion protruding in the radial direction, provided on the outer circumference of the center shaft; and

a stator comprising hollow magnetic poles forming a center space having a spiral-shaped groove with the same pitch as the rotator,

wherein the center shaft of the rotator is within the hollow magnetic poles forming a center space of the stator;

the side face of the spiral-shaped portion of the rotator in the axial direction and the side face of the spiral-shaped groove of the stator in the axial direction are opposed to each other in a direction parallel with the axis of the center shaft;...”.

Applicants submit that the present clarifications render the present claims clearly distinguished over the cited reference.

**Claim Rejections - 35 U.S.C. §103(a)**

Claim 1 is rejected under 35 U.S.C. §103(a) as being obvious by Saburo as applied to claim 1, and further in view of US 4,751,411 to Fukaya et al.

The Examiner admits that Saburo does not teach that the rotator has a permanent magnet on the spiral side face of the spiral shaped portion. The Examiner concludes that it would have been obvious to modify the spiral linear motor of Saburo by providing a permanent magnet on the side face facing the stator, as taught by Fukaya et al., to enhance the magnetic interaction between the stator and rotor for the motor to produce enhanced output.

Applicants respectfully disagree with the rejection and submit that since claim 1 is distinguished, then since claim 2 is dependent from and necessarily includes at least the limitations of claim 1, claim 2 is necessarily distinguished as well.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.


If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

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If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,  
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Enclosures    Replacement drawing sheets for Figs. 1, 2, 5, 7a, 7b, 8, 9, 10, 11, 12 and 14.